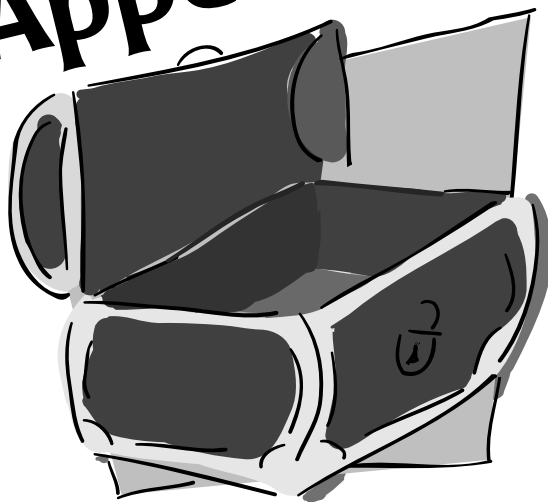


Appendix



Soil Characterization Site Definition Sheet

Soil Characterization Data Sheet

Soil Temperature Data Sheet

Soil Moisture Site Definition Sheet

Soil Moisture Data Sheet – Star Pattern

Soil Moisture Data Sheet – Transect Pattern

Soil Moisture Data Sheet – Depth Profile

Bulk Density Data Sheet

Soil Particle Density Data Sheet

Soil Particle Size Distribution Data Sheet

Soil pH Data Sheet

Soil Fertility Data Sheet

Digital Multi-Day Soil Thermometer Calibration and Reset Data Sheet

Digital Multi-Day Soil Thermometer Data Sheet

Daily Soil Moisture Sensor Data Sheet

Biannual Soil Moisture Sensor Calibration Data Sheet

Soil Infiltration Data Sheet

Textural Triangle

Glossary

Soil Investigation

Soil Characterization Site Definition Sheet

Study Site Name: SCS-_____

Location: Latitude: _____° ☐ N or ☐ S Longitude: _____° ☐ E or ☐ W

Elevation: ____ meters Slope: _____° Aspect: _____°

Source of Location Data (check one): ☐ GPS ☐ Other _____

Method (choose one):

- ☐ Pit
☐ Auger
☐ Near Surface

Is Soil Characterization site:

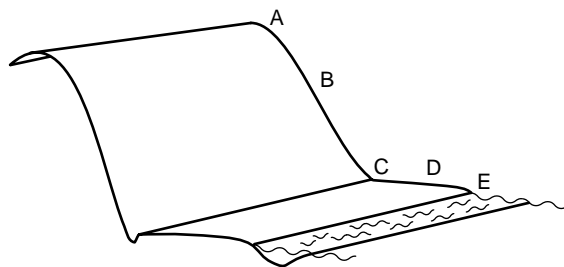
- ☐ On school grounds
☐ Off school grounds

Site Location (choose one):

- ☐ Near the Soil Moisture Study Site
☐ Near the Soil Moisture and Atmospheric Study Sites
☐ Near the Atmosphere Study Site
☐ In the Biology Study Site
☐ Other _____

Landscape Position (choose one):

- ☐ A. Summit
☐ B. Slope
☐ C. Depression
☐ D. Large Flat Area
☐ E. Streambank



Cover Type:

- ☐ Bare Soil
☐ Rocks
☐ Grass
☐ Shrubs
☐ Trees
☐ Other _____

Parent Material:

- ☐ Bedrock
☐ Organic Material
☐ Construction Material
☐ Marine Deposits
☐ Lake Deposits
☐ Stream Deposits (Alluvium)
☐ Wind Deposits (Loess)
☐ Glacial Deposits (Glacial Till)
☐ Volcanic Deposits
☐ Loose materials on slope

Land Use:

- ☐ Urban
☐ Agricultural
☐ Recreation
☐ Wilderness
☐ Other _____

Distance from Major Features: _____

Other Distinguishing Characteristics of this Site: _____

Soil Investigation

Soil Characterization Data Sheet

Date of Characterization: _____ Local Time of Characterization: _____ (Hours:Min) UT of Characterization: _____ (Hours:Min)

Study Site: SCS- _____ Method (choose one): _____ Pit _____ Auger _____ Near Surface

Horizon Number	Top Depth (cm)	Bottom Depth (cm)	Structure (granular, blocky, platy, prismatic, columnar, single grained, massive)	Main Color (code from color book)	Second Color (code from color book)	Consistence (loose, friable, firm, extremely firm)	Texture (sand, loamy sand, sandy loam, sandy clay loam, sandy clay, silt, silty clay, silty clay loam, silty clay loam, clay)	Rocks (none, few, many)	Roots (none, few, many)	Carbonates (none, slight, strong)

Soil Investigation

Soil Temperature Data Sheet

Study Site: _____

Name of Collector/Analyst/Recorder: _____

Date: _____

Soil Thermometer: Dial _____ Digital _____ Other _____

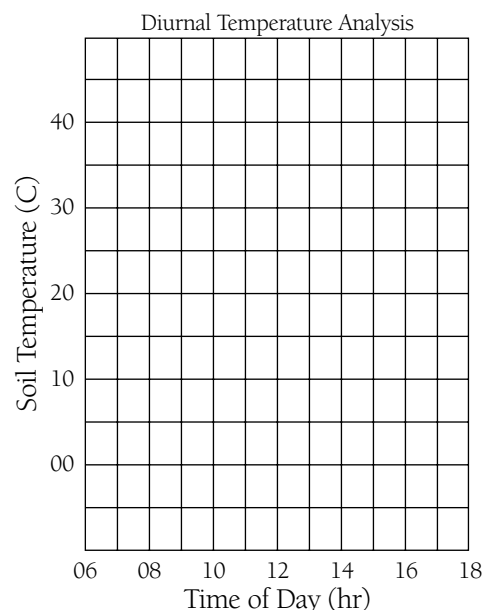
Has there been precipitation within the last 24 hours? Yes _____ No _____

Daily/Weekly Measurements

Sample No.	Time		Temperature	
	(hr)	(min)	5 cm (C)	10 cm (C)
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____

Diurnal/Cycle Measurements

Sample No.	Time		Temperature	
	(hr)	(min)	5 cm (C)	10 cm (C)
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____



Daily Metadata/Comments: _____

Soil Investigation

Soil Moisture Site Definition Sheet

Create a unique name for your site and give concise directions to it.

Study Site: _____

Directions: _____

Location: Latitude: _____ ° ☐ N or ☐ S Longitude: _____ ° ☐ E or ☐ W

Elevation: _____ meters

Source of Location Data (check one): ☐ GPS ☐ Other _____

Site Metadata

Distance to nearest rain gauge or instrument shelter: _____ m; Direction _____

Distance to nearest Soil Characterization Sample Site: _____ m; Direction _____

State of Soil Moisture Study Site:

☐ Natural ☐ Plowed ☐ Graded ☐ Backfill ☐ Compacted ☐ Other _____

Surface Cover:

☐ Bare Soil ☐ Short grass (<10 cm) ☐ Long grass (10 cm) ☐ Other _____

Canopy Cover:

☐ Open ☐ Some Trees within 30 m ☐ Canopy Overhead _____

Structures within 30 m: ☐ No ☐ Yes (describe size) _____

Soil Characterization:

(Take these values from the *Soil Characterization Data Work Sheet* for the nearest Soil Characterization Sample Site.)

	0-5 cm	10 cm	30 cm	60 cm	90 cm
Structure	_____	_____	_____	_____	_____
Color	_____	_____	_____	_____	_____
Consistence	_____	_____	_____	_____	_____
Texture	_____	_____	_____	_____	_____
Rocks	_____	_____	_____	_____	_____
Roots	_____	_____	_____	_____	_____
Carbonates	_____	_____	_____	_____	_____
Bulk Density	_____	_____	_____	_____	_____

Soil Particle Size Distribution:

% Sand	_____	_____	_____	_____	_____
% Silt	_____	_____	_____	_____	_____
% Clay	_____	_____	_____	_____	_____

Collector's comments:

[illegible]

Site Sketch:

(Scale 1 square = _____)

[illegible]

Soil Investigation

Soil Moisture Data Sheet - Star Pattern

Study Site: SMS-_____

Name of Collector/Analyst/Recorder: _____

Sample collection date: _____

Local Time: _____ (Hours:Min) UT: _____ (Hours:Min)

Current Conditions: Is soil saturated? ☐ Yes ☐ No

Drying Method: ☐ 95-105° C oven ☐ 75-95° C oven ☐ microwave

Average Drying Time: _____ (hours or minutes)

Bearing from Star Center (optional): _____ Distance from Star Center: _____

Observations: _____

Near-Surface Samples:

Sample Number	Sample Depth	Container Number	A. Wet Weight (g)	B. Dry Weight (g)	C. Water Weight (A-B)	D. Container Weight (g)	E. Dry Soil Weight (B-D)	F. Soil Water Content (C/E)
1	0-5 cm	_____	_____	_____	_____	_____	_____	_____
	10 cm	_____	_____	_____	_____	_____	_____	_____
2	0-5 cm	_____	_____	_____	_____	_____	_____	_____
	10 cm	_____	_____	_____	_____	_____	_____	_____
3	0-5 cm	_____	_____	_____	_____	_____	_____	_____
	10 cm	_____	_____	_____	_____	_____	_____	_____

Soil Investigation

Soil Moisture Data Sheet - Transect Pattern

Study Site: SMS-_____

Name of Collector/Analyst/Recorder: _____

Sample collection date: _____

Local Time: _____ (Hours:Min) UT: _____ (Hours:Min)

Current Conditions: Is soil saturated? ☐ Yes ☐ No

Drying Method: ☐ 95-105° C oven ☐ 75-95° C oven ☐ microwave

Average Drying Time: _____ (hours or minutes)

Daily Metadata: (optional)

Length of Line: _____ m Compass Bearing: _____ Station Spacing: _____ m

Directions:

Transects should be 50 m long, located in an open field. Measurements are made 12 times/yr. during a regular interval of your choice. Enter the data for your samples collected between 0-5 cm (10 single samples plus 1 triple sample):

Observations:

Sample Number	Offset from end of Transect (m)	Container Number	A. Wet Weight (g)	B. Dry Weight (g)	C. Water Weight (A-B)	D. Container Weight (g)	E. Dry Soil Weight (B-D)	F. Soil Water Content (C/E)
1	_____	_____	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____	_____	_____	_____
10	_____	_____	_____	_____	_____	_____	_____	_____
11	_____	_____	_____	_____	_____	_____	_____	_____
12	_____	_____	_____	_____	_____	_____	_____	_____
13	_____	_____	_____	_____	_____	_____	_____	_____

Soil Investigation

Soil Moisture Data Sheet - Depth Profile

Study Site: SMS-_____

Name of Collector/Analyst/Recorder: _____

Sample collection date: _____

Local Time: _____ (Hours:Min) UT: _____ (Hours:Min)

Current Conditions: Is surface soil saturated? ☐ Yes ☐ No

Drying Method: ☐ 95-105° C oven ☐ 75-95° C oven ☐ microwave

Average Drying Time: _____(hours or minutes)

Bearing from Star Center (optional): _____ Distance from Star Center: _____

Observations: _____

Depth Samples:

Sample Depth	Container Number	A. Wet Weight (g)	B. Dry Weight (g)	C. Water Weight (A-B)	D. Container Weight (g)	E. Dry Soil Weight (B-D)	F. Soil Water Content (C/E)
0-5 cm	_____	_____	_____	_____	_____	_____	_____
10 cm	_____	_____	_____	_____	_____	_____	_____
30 cm	_____	_____	_____	_____	_____	_____	_____
60 cm	_____	_____	_____	_____	_____	_____	_____
90 cm	_____	_____	_____	_____	_____	_____	_____

Soil Investigation

Bulk Density Data Sheet

Note: All measurements are done without the can lid!!

Date of sample collection: Year _____ Month _____ Day _____

Study Site: SCS- _____

Horizon Number: _____, Horizon Depth: Top _____cm, Bottom _____cm

	Sample Number		
	1	2	3
A Container volume (mL)			
B Container mass (g)			
C Wet mass of soil and container (g)			
D Dry mass of soil and container (g)			
E Mass of rocks (g)			
F Volume of water without rocks (mL)			
G Volume of water with rocks (mL)			
H Mass of dry soil (g) = D-B			
I Volume of rocks (mL) = G-F			
J Bulk Density (g/mL) = $\frac{H-E}{A-I}$			

Soil Investigation

Soil Particle Density Data Sheet

Note: All measurements should be made without the stopper/cap!!

Date soil is mixed with water: year _____ month _____ day _____

Study Site: _____

Horizon number: _____

How has the soil been stored since it came out of the oven? _____

Other comments: _____

		Sample Number		
		1	2	3
Mass of empty flask (g)	(B below)			
Mass of soil + empty flask (g)	(A below)			
Mass of water + soil + flask (g)	(D below)			
Water Temperature (°C)	(F below)			

Calculation Work Sheet

		Sample Number		
		1	2	3
A	Mass of soil + empty flask (g)			
B	Mass of empty flask (g)			
C	Mass of soil (g) (A – B)			
D	Mass of water + soil + flask (g)			
E	Mass of water (D – A)			
F	Water Temperature (°C)			
G	Density of water (g/mL) (approximately 1.0)			
H	Volume of water (mL) (E/G)			
I	Volume of soil (mL) (100 mL – H)			
J	Soil particle density (g/mL) (C/I)			

Soil Investigation

Soil Particle Size Distribution Data Sheet

Date of sample collection: Year _____ Month _____ Day _____

Study Site: _____

Horizon Number: _____ Horizon Depth: Top _____ cm Bottom _____ cm

Sample Number 1

Distance from 500 mL mark to base of graduated cylinder: _____ cm

Hydrometer Calibration Temperature: _____ °C

A. 2 minute hydrometer reading: _____

C. 24 hour hydrometer reading: _____

B. 2 minute temperature: _____ °C

D. 24 hour temperature: _____ °C

Sample Number 2

Distance from 500 mL mark to base of graduated cylinder: _____ cm

Hydrometer Calibration Temperature: _____ °C

A. 2 minute hydrometer reading: _____

C. 24 hour hydrometer reading: _____

B. 2 minute temperature: _____ °C

D. 24 hour temperature: _____ °C

Sample Number 3

Distance from 500 mL mark to base of graduated cylinder: _____ cm

Hydrometer Calibration Temperature: _____ °C

A. 2 minute hydrometer reading: _____

C. 24 hour hydrometer reading: _____

B. 2 minute temperature: _____ °C

D. 24 hour temperature: _____ °C

Soil Investigation

Soil pH Data Sheet

Date of sample collection: _____ Study Site: _____

Horizon Number: _____ Horizon Depth: Top _____cm, Bottom _____cm

Sample Number 1 – pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Sample Number 2 – pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Sample Number 3 - pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Horizon Number: _____ Horizon Depth: Top _____cm, Bottom _____cm

Sample Number 1 – pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Sample Number 2 – pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Sample Number 3 - pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Horizon Number: _____ Horizon Depth: Top _____cm, Bottom _____cm

Sample Number 1 – pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Sample Number 2 – pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Sample Number 3 - pH Measurement method (check one): ☐ paper ☐ meter

A. pH of water before adding soil _____ B. pH of soil and water mixture _____

Soil Investigation

Soil Fertility Data Sheet

Date of Sample Collection: _____ Study Site: _____

Horizon Number: _____ Horizon Depth: Top _____ cm Bottom _____ cm

Sample Number 1

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Sample Number 2

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Sample Number 3

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Date of Sample Collection: _____ Study Site: _____

Horizon Number: _____ Horizon Depth: Top _____ cm Bottom _____ cm

Sample Number 1

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Sample Number 2

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Sample Number 3

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Date of Sample Collection: _____ Study Site: _____

Horizon Number: _____ Horizon Depth: Top _____ cm Bottom _____ cm

Sample Number 1

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Sample Number 2

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Sample Number 3

Nitrate (N):

High__ Med__ Low__ None__

Phosphorus (P):

High__ Med__ Low__ None__

Potassium (K):

High__ Med__ Low__ None__

Soil Investigation

Digital Multi-Day Soil Thermometer Calibration and Reset Data Sheet

School Name: _____ Study Site: _____

Observer Names: _____

Calibration

Thermometer Readings						
Reading Number	Date (yy/mm/dd)	Local Time (hour:min)	Universal Time (hour:min)	Calibration Thermometer Readings (°C)	Digital 5 cm Sensor Readings (°C)	Digital 50 cm Sensor Readings (°C)
1						
2						
3						
4						
5						

Time of Reset

Note: The thermometer should be reset only when it is first setup, after the battery is changed, or if the time of local solar noon drifts to more than one hour from your *time of reset*.

Date: _____ Local time (Hour:Min) _____ Universal time (Hour:Min) _____

Was the reset due to a battery change? _____

5 cm Sensor Check

Thermometer Readings					
Reading Number	Date (yy/mm/dd)	Local Time (hour:min)	Universal Time (hour:min)	Soil Probe Thermometer Readings at 5 cm (°C)	Digital 5 cm Sensor Readings (°C)
1					
2					
3					
4					
5					

Soil Investigation

Digital Multi-Day Soil Thermometer Data Sheet

School Name: _____ Study Site: _____

Observer Names: _____

Date: Year _____ Month _____ Day _____

Local time (Hour:Min) _____ Universal time (Hour:Min) _____

Your *Time of Reset* in universal time (Hour:Min): _____

Current Temperatures

5 cm soil temperature (°C): _____

50 cm soil temperature (°C): _____

Maximum, Minimum Temperatures

Do not read the thermometer within 5 minutes of your *time of reset*.

	Label on Digital Display Screen					
	D1	D2	D3	D4	D5	D6
Maximum 5 cm Temperature (°C)						
Minimum 5 cm Temperature (°C)						
Maximum 50 cm Temperature (°C)						
Minimum 50 cm Temperature (°C)						
If you are reading thermometer AFTER your <i>time of reset</i> : Correspond to 24-hour Period Ending:	Today	Yesterday	Two days ago	Three days ago	Four days ago	Five days ago
If you are reading thermometer BEFORE your <i>time of reset</i> : Correspond to 24-hour Period Ending:	Yesterday	Two days ago	Three days ago	Four days ago	Five days ago	Six days ago

Soil Investigation

Daily Soil Moisture Sensor Data Sheet

School Name: _____

Study Site: _____

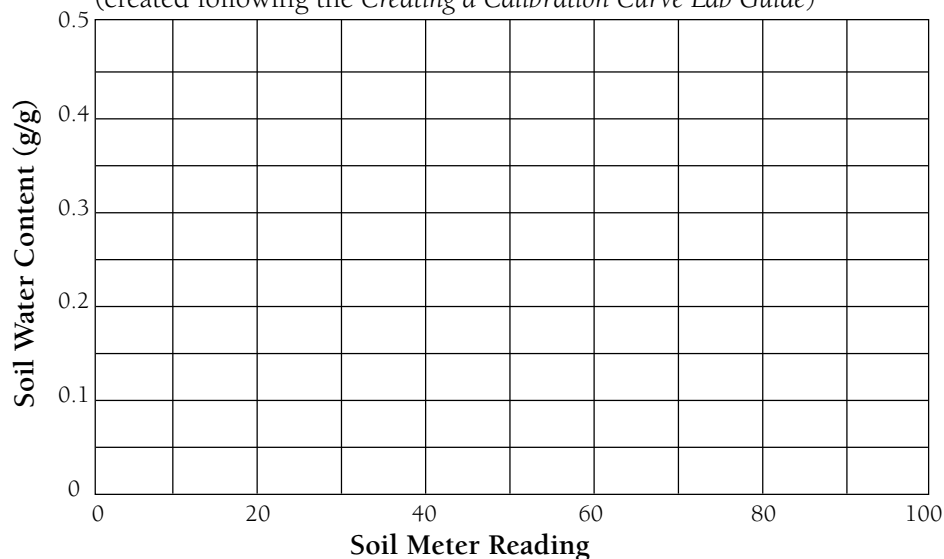
Date you started to use this SWC calibration curve: _____

Observations:

Measurement					Soil Moisture Meter Readings				SWC from Calibration Curve			
#	Date	Time (UT)	Is the soil saturated? Yes or No	Observers' Names	10 cm	30 cm	60 cm	90 cm	10 cm	30 cm	60 cm	90 cm
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Calibration Curve

(created following the *Creating a Calibration Curve Lab Guide*)



Soil Investigation

Biannual Soil Moisture Sensor Calibration Data Sheet

School Name: _____

Study Site: _____

Drying Method (check one): 95-105 °C oven ____; 75-95 °C oven ____; microwave ____

Average Drying Time: _____ (hours or minutes)

Depth (Check one): ☐ 10 cm ☐ 30 cm ☐ 60 cm ☐ 90 cm

Observations:

Measurement											
#	Date	Local Time Hour:min	Time (UT)	Observers' Names	A. Wet Mass (g)	B. Dry Mass (g)	C. Water Mass (A-B)	D. Can Mass (g)	E. Dry Soil Mass (B-D)	F. Soil Water Content (C/E) Reading	G. Soil Moisture Meter Reading
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Soil Investigation

Biannual Soil Moisture Sensor Calibration Data Sheet – Continued

School Name: _____

Study Site: _____

Depth (Check one): ☐ 10 cm ☐ 30 cm ☐ 60 cm ☐ 90 cm

Observations:

Measurement											
#	Date	Local Time Hour:min	Time (UT)	Observers' Names	A. Wet Mass (g)	B. Dry Mass (g)	C. Water Mass (A-B)	D. Can Mass (g)	E. Dry Soil Mass (B-D)	F. Soil Water Content (C/E) Reading	G. Soil Moisture Meter Reading
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Soil Investigation

Soil Infiltration Data Sheet

Site Name: _____

Name of Collector/Analyst/Recorder: _____

Sample collection

- date: _____
- time: _____ (hours and minutes) check one: UT _____ Local _____

Distance to Soil Moisture Site _____ m

Sample Set number: _____ Width of your reference band: _____ mm

Diameter: Inner Ring: _____ cm Outer Ring: _____ cm

Heights of reference band above ground level: Upper : _____ mm Lower : _____ mm

Directions:

Take 3 sets of infiltration rate measurements within a 5 m diameter area. Use a different data work sheet for each set. Each set consists of multiple timings of the same water level drop or change until the flow rate becomes constant or 45 minutes is up. Record your data below for one set of infiltration measurements you take.

The form below is setup to help you calculate the flow rate.

For data analysis, plot the Flow Rate (F) vs. Midpoint time (D).

Observations:

	A. Start	B. End	C. Interval	D. Midpoint	E. Water Level Change	F. Flow Rate
	(min) (sec)	(min) (sec)	(min) (B-A)	(min) (A+C/2)	(mm)	(mm/min) (E/C)
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____	_____

Saturated Soil Water Content below infiltrometer after the experiment:

A. Wet Weight: _____ g B. Dry Weight: _____ g C. Water Weight (A-B): _____ g

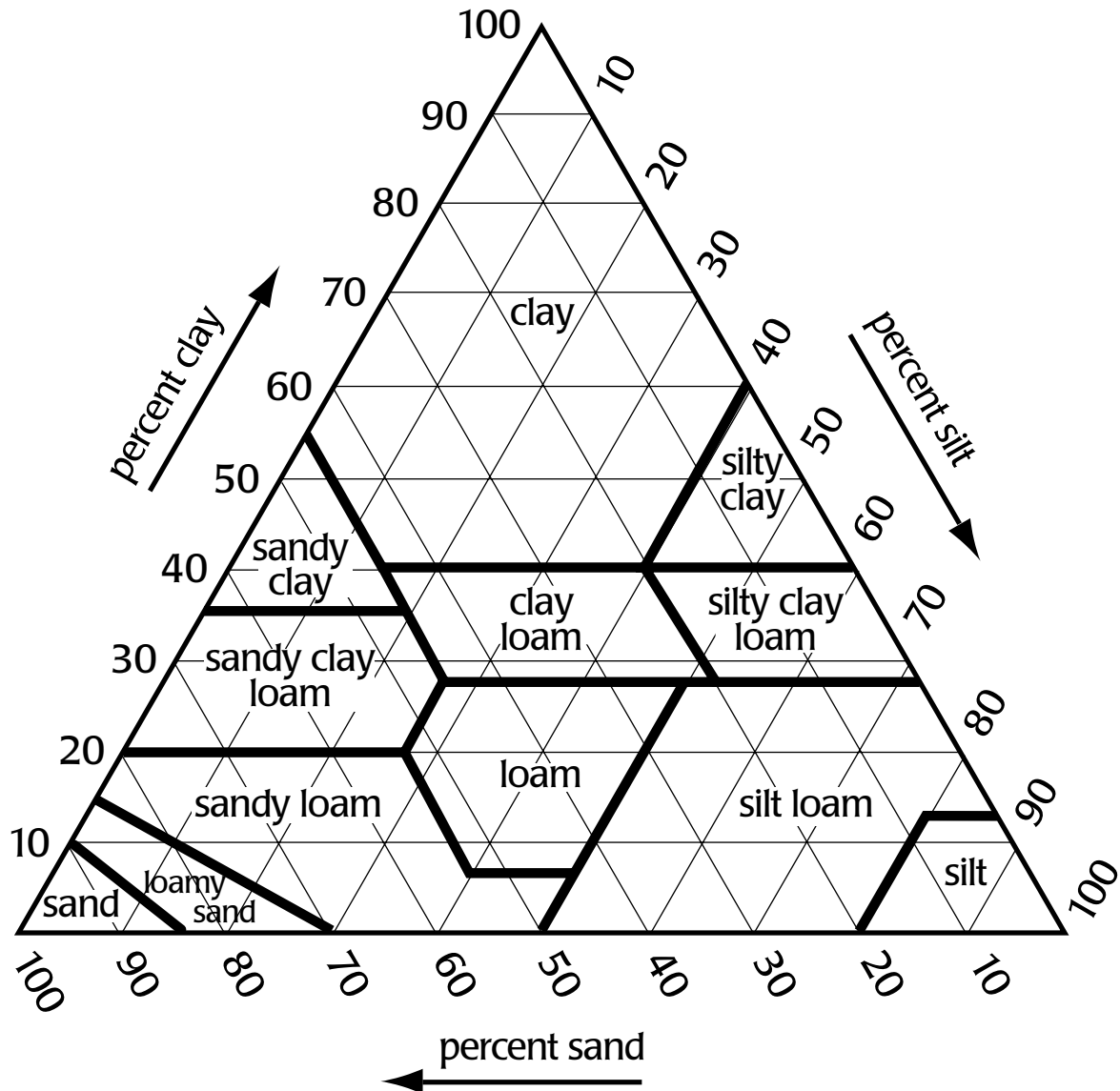
D. Container Weight: _____ g E. Dry Soil Weight (B-D): _____ g

F. Soil Water Content (C/E) _____

Daily Metadata/Comments: (optional) _____

Soil Investigation

Textural Triangle 3



Glossary



Acid Soil

A soil that contains more hydrogen ions than hydroxide ions and therefore has a pH less than 7.0

Alluvium

Sediment transported by flowing water (e.g. a stream)

Anomaly

Something irregular or abnormal

Basic Soil

A soil that contains more hydroxide ions than hydrogen ions and therefore has a pH greater than 7.0

Blocky Structure

Irregular block-like soil peds that are usually 1.5 cm to 5.0 cm in diameter

Bulk Density

Mass of dry soil per unit volume (expressed in GLOBE as grams per cubic centimeter)

Chroma

When referenced to hue, the level of intensity of a color

Columnar

A type of soil structure where the soil peds (or chunks) are in the shape of a column with a rounded top. This is found in arid regions.

Concretions

Rounded masses of mineral matter

Cryoturbation

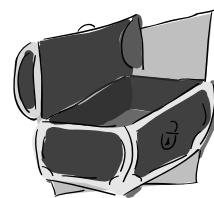
Process of freezing, thawing, and churning of a soil

Dissolution

Soils, among other compounds, start dissolving into smaller units when placed in contact with water.

Diurnal cycle

A daily cycle, a basic repetition period of 24 hours. All processes that are dominated by the sun are diurnal. Tides, in contrast, repeat cycles twice daily.



Effervescence

The bubbling action that occurs as a gas comes out of a liquid for example when the carbon dioxide gas caused by the reaction of carbonate coatings on soil with an acid bubbles through acidic liquid

Eluviation

The removal of materials in one horizon which are then “illuviated” or deposited into a lower horizon

Erosion

The removal and movement of soil materials by water, wind, ice, or gravity as well as by human activities such as agriculture or construction

Evaporation

Water on Earth's surface or in the soil absorbs heat from the sun to the point that it vaporizes or evaporates and becomes part of the atmosphere

Extremely Firm

A type of soil consistence in which soil peds require extreme pressure, requiring the use of a tool (e.g., a hammer), to break

Face

The way an exposed section of soil or soil profile appears

Firm

A type of soil consistence in which the soil peds require significant pressure before breaking

Floury

Having the feel of wheat flour – smooth and powdery

Free Carbonates

Carbonate materials that form coatings on soil that react with an acid to form carbon dioxide gas

Freeze-thaw

The mechanical break up of rock caused by the expansion of freezing water in cracks and crevices

Friable

A type of soil consistence in which the soil ped “pops” when squeezed between the thumb and fore finger with a small amount of pressure

Glacial Till

Sediment deposited from a melting glacier

Granular Structure

Roundish soil peds that are usually less than 5.0 cm in diameter

Gravimetric

Relating to measurement by weight or variations in a gravitational field

Groundwater

Water stored underground in a saturated zone of rock, sand, gravel or other material

Heat Capacity

The ratio of the heat required to raise the temperature of an object or substance to the change in temperature

Horizon

An individual layer within the soil which has its own unique characteristics (such as color, structure, texture, or other properties) that make it different from the other layers in the soil profile

Hue

A particular color as distinguished from other colors

Humus

The part of the soil profile that is composed of decomposed organic matter from dead and decaying plants and animals

Hydrometer

An instrument based on the principles of buoyancy used to measure the specific gravity of a liquid in relation to the specific gravity of pure water at a specified temperature

Illuviation

The deposit of materials carried by water from one horizon into another within the soil (such as clay or nutrients in solution)

Infiltration

Downward entry of water into the soil

In situ

Latin for the original position

Leaching

Removal of soluble material in solution from the soil by the movement of water through the soil

lithosphere

The outer layer of soil and rock on a planet is called the “lithosphere” after the Greek word “lithos” meaning “stone.”

Litter

The covering over the soil in a forest made up of leaves, needles, twigs, branches, stems, and fruits from the surrounding trees

Loess

Sediment transported by wind

Loose

A type of soil consistence in which the soil grains do not stick to one another (i.e. structure is single grained).

Massive Structure

A structureless soil in which all soil particles are stuck together and there are no distinct peds

Metadata

Data about data. Soil moisture data requires metadata describing the vegetation cover and possible sources of water in order to be interpreted properly.

Mottles

Spots of different colors in a soil, usually indicating poor drainage

Nomenclature

A particular naming convention agreed to by many individuals or scientists

Organic Matter

Any plant or animal material added to the soil

Particle Density

The mass per unit volume of soil particles, excluding pore space

Particle Size Distribution

The amount (percent) of each of sand, silt, and clay in a soil sample

**Ped**

An individual unit of natural soil structure or aggregation (such as granular, blocky, columnar, prismatic, or platy)

Pedogenesis

The formation of soil profiles depending on the five soil-forming factors (climate, parent material, topography, organisms, and time) to create the Pedosphere

Pedosphere

The thin outer layer of the Earth which is made up of soil. The pedosphere acts as an integrator between the atmosphere, biosphere, lithosphere, and hydrosphere of the Earth.

Permafrost

A continuously frozen soil horizon

Platy Structure

Flat, plate like soil peds

Porosity

Percentage of soil volume not occupied by solid material

Prismatic

A type of soil structure in which the soil ped is in the shape of a prism

Runoff

Water that falls on the land surface but does not infiltrate and therefore flows across the land surface

Single-grained Structure

A structureless soil in which each soil grain is loose in the soil (i.e. there are no peds)

Soil Consistence

How easy or hard it is for a soil ped to break apart when it is squeezed

Soil Fertility

The ability of a soil to supply the elements and compounds needed for plant growth

Soil Horizons

An identifiable soil unit due to color, structure, or texture

Soil pH

Measure of the acidity of a soil

**Soil Profile**

The “face” of a soil when it has been cut vertically that shows the individual horizons and soil properties with depth

[Soil] Saturation

When the pores of a soil are completely filled with water

Soil Structure

The shape of soil units (peds) that occur naturally in a soil horizon. Some possible soil structures are granular, blocky, prismatic, columnar, or platy. Soils can also be structureless if they do not form into peds. In this case, they may be a consolidated mass (massive) or stay as individual particles (single-grained).

Soil Texture

The way soil “feels” when it is squeezed between the fingers or in the hand. The texture depends on the amount of sand, silt, and clay in the sample (particle size distribution), as well as other factors (how wet it is, how much organic matter is in the sample, the kind of clay, etc.)

Soil Water Content

A measure of how much water is present in the pores of a soil, specifically, the ratio of the mass of water to the mass of dry soil.

Subsoil

The common term for the layers beneath the topsoil

Supernatant

Liquid above the settled soil that is cleaner than the soil

Topsoil

The common term for the top layer of soil

Transect

In any field (outdoor) study, a transect consists of a line of study, often divided into intervals where observations or samples are collected.

Transpiration

Water in plants escapes or transpires into the atmosphere as the leaf stomates open to exchange carbon for oxygen.

Uniform

This term is used in its traditional sense that some characteristic displays similar properties. Two related words are homogeneous (distributed evenly) and normal (distributed about a central mean value and described by a statistical equation).

Value

When referenced to hue, an indication of the lightness of a color.

Volatilization

Evaporation of elements from the soil

Water Erosion

The physical fracturing and chemical decomposition of rock by water

Wind Erosion

The disintegration and decomposition of rock by wind